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SOILS OF THE EASTERN UNITED STATES AND THEIR USE—XXIX.

THE CROWLEY SILT LOAM.

BY

JAY A. BONSTEEL,

Scientist in Soil Survey.



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BUREAU OF SOILS.

MILTON WHITNEY, *Chief of Bureau.*

ALBERT G. RICE, *Chief Clerk.*

SCIENTIFIC STAFF.

FRANK K. CAMERON, in charge of Physical and Chemical Investigations.

CURTIS F. MARBUT, in charge of Soil Survey.

OSWALD SCHREINER, in charge of Fertility Investigations.

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THE CROWLEY SILT LOAM.

GEOGRAPHICAL DISTRIBUTION.

The Crowley silt loam is of limited distribution. It is found principally in the southern and southwestern parishes of Louisiana and in the Arkansas counties lying between the Arkansas and the White Rivers. It has been encountered thus far in only three soil-survey areas located in these two States. It is probable that its region of distribution extends from Acadia Parish, La., westward through the lower lying Gulf prairie section of southwestern Louisiana and into eastern Texas, and includes the area already mentioned in east-central Arkansas. A total area of 477,120 acres of the Crowley silt loam has been encountered in the three soil surveys made in central Arkansas and southwestern Louisiana.

CHARACTERISTICS OF SOIL AND SUBSOIL.

The Crowley silt loam is a brown or ashy gray silt loam ranging in depth from 10 to 16 inches, underlain by a gray or mottled heavy silt loam or silty clay, which frequently contains concretions of iron and calcium carbonate. The subsoil ranges in color from gray to reddish yellow, mottled with red and brown, and is stiff and impervious in all localities where it has been encountered.

SURFACE FEATURES AND DRAINAGE.

The Crowley silt loam occupies level to very gently undulating prairie areas both in the Louisiana region and in central Arkansas. These prairies are frequently separated or interspersed by timbered areas along the larger streams or by small groups and clumps of trees. Otherwise the surface of the type is practically free from timber and very level. In absolute elevation above sea level the surface of this type ranges from 25 to 30 feet in the extreme southern part of Louisiana to altitudes in excess of 200 feet in central Arkansas. In all cases, however, the surface of the type lies at an elevation of not over 25 or 30 feet above the local drainage lines.

LIMITATIONS IN USE.

Before the introduction of rice culture upon this soil type very little agricultural use was made of it. In Arkansas the prairie grasses were used for grazing purposes, and the better drained and higher lying portions of the type were beginning to be cultivated to cereal grains and forage crops. These uses of the type, however, are entirely subordinate to its principal utilization as the chief rice-growing soil of the western Gulf States. While small areas are annually planted to cotton, corn, cowpeas, and even oats or wheat, the great use of the soil is for the production of the rice crop.

IMPROVEMENT IN SOIL EFFICIENCY.

The Crowley silt loam, owing to its flat topography, to its slight elevation above the main drainage channels, and to the impervious nature of both the surface soil and subsoil, is in its natural condition for the most part poorly drained. In consequence, wherever this soil type is to be used for the production of other crops than rice, and even in many of the areas devoted to rice growing, the installation of proper systems of tile underdrainage constitutes one of the most important improvements in its physical condition. In central Arkansas good yields of corn, oats, and cowpeas are now secured upon the higher lying and naturally well-drained portions of the type. These show clearly the necessity for underdrainage of other portions of the type which are to be used for similar agricultural purposes. The cost of establishing a complete system of tile drainage sufficient to relieve the soil of excess amounts of moisture and to render it capable of producing cotton, corn, and the other staple crops of the region where it occurs, should not exceed \$20 per acre.

Even in the rice-growing district where the flooding of the soil for rice production is practiced, it has been found that the underdrainage of the soil is sometimes insufficient to secure the best results even with an irrigated crop. There has been some difficulty through the accumulation of soluble salts within the surface soil in the rice fields, and thorough underdrainage is the only permanent remedy for these accumulations of so-called alkali salts.

The high acreage value of the rice crop has led to the constant occupation of areas of this type for its production. It has been found within recent years that it will be necessary to devise some system of crop rotation which will enable the planter to grow other crops between the years devoted to rice culture. No regular system of crop rotation for the rice land has been worked out, and it would be difficult to suggest such a system in the absence of the artificial underdrainage of the type. Wherever the lands are naturally well drained, or wherever they may be improved by the installation of

tile drainage, it would be possible to alternate rice with cotton or to arrange a rotation whereby rice, cotton, corn, and cowpeas could be adjusted to a system of farming suited to this type of soil. It has been found that the constant flooding of the soil for rice production and the growing of the rice crop year after year tends to diminish somewhat the yields secured from the Crowley silt loam and at the same time tends to spread the growth of the wild rice or red rice which sometimes infests the fields. The latter pest may be thoroughly eliminated by the adoption of a proper system of crop rotation whereby the red rice is allowed to germinate and to make its growth and to be destroyed during the year when the soil would be occupied by some other crop such as cotton or corn. The land would then be ready for another crop of the cultivated rice, which would be found to be largely free from the red rice.

EXTENT OF OCCUPATION.

In southern Louisiana practically all of the areas of the Crowley silt loam which are so located as to be readily irrigated are occupied for rice cultivation. Westward from this region in southwestern Louisiana and in the eastern Gulf section of Texas there are still large areas of the type which may be made available for rice culture when the proper plants for the irrigation of this soil have been installed. Similarly in east-central Arkansas there are considerable areas upon which the water has not yet been brought for the purposes of rice irrigation. It is probable that more than 50 per cent of the total area of this soil type in these localities is still available for development for rice culture.

CROP ADAPTATIONS.

The Crowley silt loam is the typical rice land of southwestern Louisiana and east-central Arkansas. It is probable that more rice is grown upon this soil than upon all other rice soils in the United States. In fact, the development of this type for agricultural purposes has been almost coextensive with the development of the rice industry in the western Gulf States. Prior to its utilization for extensive rice culture the Acadian population of southern Louisiana had grown small patches of rice on the low flat areas along the bayous where drainage waters from the upland could be turned upon the field. Considerable rice was also grown dependent upon annual rainfall for its moisture supply or upon a small amount of irrigation water which could be turned upon the rice fields in periods of drought. The first improvement over this method was that of impounding part of the water in a low-lying field and allowing it to spread over the planted crop. Usually, however, the reser-

voirs covered too large a proportion of the arable land, and the amount of water thus stored was not sufficient to carry the crop through long periods of drought. It was not until 1885 that it was demonstrated that water from the bayous which intersect the prairies could be successfully used. Pumps were then installed in the vicinity of Crowley, La., and the water from the bayous was lifted to higher levels for the irrigation of the prairie land. At a later date improved pumps were substituted, and the present system of rice cultivation in southwestern Louisiana and southeastern Texas was begun. In 1892 the first centrifugal pumps were installed, and since that date rice growing has been widely extended over the coast prairie section of southern Louisiana and southeastern Texas. At present over 400 miles of main canals and laterals have been built in Acadia Parish alone, and the water thus supplied is sufficient to irrigate upward of 100,000 acres of rice land. Both rotary and centrifugal pumps are used. The engines employed usually range from 100 to 400 horsepower, burning crude oil as the most economical fuel. The canals are constructed somewhat above the level of the prairie by throwing up broad embankments and excavating the canal upon their surface. From these high-level, main lines of canals the laterals are extended to the various farms and rice plantations. Frequently it is necessary to install secondary pumps at some points in the main canal to give the water an additional lift for gravity distribution over more remote systems covered by the canal.

In addition to these changes in the method of irrigation a vast change has been brought about in the actual method of seeding and harvesting the crop. In place of the old hand method, which differed little from that employed in oriental countries, the rice crop is now seeded with modern grain drills and harvested with binders. Even the threshing machinery of the more northern grain-growing States has been adapted to the conditions necessary for the threshing of the rice crop. In this way the crop has passed from a stage of small areas, grown by primitive methods by a few small farmers, to a great industry involving the investment of millions of dollars in pumping plants, machinery, and the embankment of the land.

The yields of rice upon the Crowley silt loam range from 6 to 15 sacks per acre under ordinary conditions. Larger yields are frequently reported, but it is thought that the average yield throughout a long period of years is not far from 10 sacks per acre.

Although rice is the dominant crop upon this soil type, corn, oats, cowpeas, potatoes, and other vegetables are also grown, particularly in east-central Arkansas. The type yields from 30 to 50 bushels per acre of oats, and about 15 to 20 bushels of corn for an average yield. Irish potatoes give yields ranging from 100 to 150 bushels per acre, and sweet potatoes from 200 to 300 bushels. A considerable quantity

of native prairie hay is also cut upon this type in Arkansas, giving yields ranging from 1 to 2 tons per acre. The dairy industry has been fairly well established upon the more rolling sections of the prairie, which are not so well suited topographically to the production of rice as the more level and poorer-drained sections of this type.

Considerable areas of the Crowley silt loam still remain unoccupied for the growing of irrigated rice. As economic conditions prove favorable there will doubtless be a considerable extension of rice production upon this soil.

SUMMARY.

The Crowley silt loam occurs chiefly in the Gulf coast prairie region of southwestern Louisiana and eastern Texas, although considerable areas of the type are also found in the prairie section lying between the Arkansas and the White River in east-central Arkansas.

While other crops are grown to a limited extent upon the type, rice under irrigated conditions constitutes the great dominant crop, and hundreds of miles of irrigation canals have been built for the supplying of water to the paddy fields. Since 1885 the acreage devoted to rice upon the Crowley silt loam in Louisiana, Texas, and Arkansas has grown from practically nothing to hundreds of thousands of acres.

For the production of rice upon the Crowley silt loam pumping plants, irrigation canals, and embanked fields are necessary. Modern farm machinery is used for the preparation of the land, the seeding of the crop, and the harvesting and threshing of the grain.

As the demand for rice in the United States increases there will be thousands of acres of the Crowley silt loam available for the extension of the irrigated rice crop.

Approved.

JAMES WILSON,
Secretary of Agriculture,

WASHINGTON, D. C., *December 20, 1911.*

APPENDIX.

The following table shows the extent of the Crowley silt loam in the areas surveyed to the present time. In the first column is stated the particular survey in which the soil was encountered; in the second column, its extent in acres; and in the third column, the volume of the Field Operations of the Bureau of Soils in which the report upon the area may be found. Those desiring a detailed description of the soil and of the general conditions surrounding it in any particular area may consult these volumes in almost any public library.

Areas of Crowley silt loam encountered in the soil survey.

Survey.	Area of soil.	Date. ¹
Arkansas:	<i>Acres.</i>	
Prairie County.....	100,160	1906
Stuttgart area ²	132,800	1902
Louisiana: Acadia Parish.....	244,160	1903

¹ Year of publication, Field Operations.

² Mapped as Almyra silt loam and Miami clay loam.





